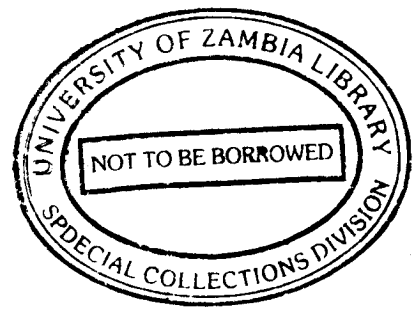
FACTORS AFFECTING COFFEE EXPORTS IN ZAMBIA



A Thesis Presented to the Department of Agricultural Economics and Extension Education of the University of Zambia

By

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LIST OF ABBREVIATIONS AND ACRONYMS

APC	African Plantation Company Limited.
BOZ	Bank of Zambia.
CBZ	Coffee Board of Zambia.
CSO	Central Statistics Office.
CLRM	Classical Linear Regression Model.
EBZ	Export Board of Zambia.
FAO	Food Agricultural Organization.
IACO	Inter-African Coffee Association.
ICO	International Coffee Organization.
MDC	Mpongwe Development Company.
OLS	Ordinary Least Squares.
SAPCO	Southern African Producers Coffee Organization.
SCAA	Speciality Coffee Organization of America.
SSA	Sub-Saharan Africa.
SPSS	Statistical Package for Social Sciences.
ZCGA	Zambia Coffee Growers Association.

ABSTRACT

FACTORS AFFECTING COFFEE EXPORTS IN ZAMBIA

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This study investigates the factors that affect coffee exports in Zambia. A regression model is postulated based on international trade theory and estimated using SPSS. Given that there was no serious deviation from the Classical Linear Regression Model (CLRM), Ordinary Least Squares (OLS) was used to estimate the model. Data for the model was obtained from Zambia Coffee Growers Association (ZCGA), Ministry of Agriculture and Co-operatives (MACO), Coffee Board of Zambia (CBZ), FAO's World Agriculture Information Centre (WAICENT) website on Internet, Bank of Zambia (BOZ), Export Board of Zambia (EBZ) and Central Statistics Office (CSO).

The results suggested that the cost of inputs, lagged price of coffee, real exchange rate, lagged price of cotton have a significant effect on net quantity of coffee exported per capita. Except for the lagged price of coffee, the quantity of coffee exported is highly responsive to slight changes in the variables. In other words a positive increase in the lagged price of coffee will cause a small increase in the quantity of coffee exported. While for a decrease in the cost of inputs and price of cotton, there will be a greater proportionate increase in the quantity of coffee exported and the converse is also true. In the case of the exchange rate depreciation of the currency, will increase the competitiveness of the country and consequently increase the net amount of coffee exported per capita and the converse is true. The other variation not explained by the model might be due to other factors, which cannot be easily quantified such as technology, transportation, extension services, reliability of the marketing net works and organizations.

Based on these findings, it is recommended that Government intervention through provision of inputs subsidies, ensuring competitive prices for coffee and reduction on the overvaluation of the kwacha will support the coffee sector and consequently increase the net quantity of coffee exported per capita. Further more government intervention through the provision of addition skills on the part of the producer, provision of suitable markets, technology and information environment will help support the coffee sector. Finally there is need for a comprehensive study to analyze the main factors affecting foreign countries imports of coffee, and to interpret the implications for Zambian coffee policy.

CHAPTER 1
INTRODUCTION

1.1 Background

Coffee is a native of Tropical Africa from where it has been introduced to most tropical countries in the world. Different varieties of coffee are found in various countries. There are two major varieties of coffee; Arabica and Robusta coffee (Anochili, 1986).

Coffee is one of the cash crops grown and exported by Zambia. Over 90 percent of the coffee produced in Zambia is exported and mostly in form of grain. Zambia exports 94 percent of her coffee through direct shipment to the North Western Europe and Scandinavia and recently to the Japanese Market (See Table 1). Presently Japan accounts for 5 percent of the exports. One of the objectives of Zambia Coffee Growers Association is to increase exports to Japan to 10%. Locally this industry is controlled by the Coffee Board of Zambia (CBZ) with a statutory delegation of most of its functions to the farmer-run Zambia Coffee Growers Association (ZCGA, 2004).

The ZCGA according to the coffee act is the only authorized organization to sell, deliver for sale or dispose of or market any coffee processed in Zambia. This implies that all producers or growers have to be members of ZCGA in order to benefit from the marketing services, any negotiations for crop prices and financing undertaken by the association on behalf of members.

For the purpose of keeping abreast with the international developments Zambia is a member of many regional and international organization, which include, Speciality Coffee Organization of America (SCAA), Southern African Producers Coffee organizations (SAPCO), International Coffee Organization (ICO) and

Table 1: Major Markets for Zambian Coffee Exports in Mts from 1991 to 2001

Country	1991/2	1992/3	1993/4	1994/5	1995/6	1996/7	1997/8	1998/9	1999/0	2000/1
Denmark	18.00	16.80	-	-	-	-	-	-	-	-
Germany	706.4	638.6	784.9	342.5	103.5	526.5	436.6	924.0	621.2	1176.
Japan	-	-	-	-	-	-	-	-	9.400	16.80
Netherlands	298.8	88.98	100.62	18.0	17.10	186.60	144.78	328.20	102.60	91.20
South Africa	69.6	184.8	146.46	587.28	1166.83	1123.08	1564.18	1761.9	1349.64	1697
Switzerland	667.58	586.0	504.4	248.0	247.4	-	-	-	-	-
UK	-	-	-	-	-	12.24	54.00	19.20	-	94.80
USA	-	-	-	-	9.000	36.00	86.10	245.5	105.5	19.20

Note: - No Amount of Coffee Exported
Source: CBZ, 2003

Inter-African Coffee Organization (IACO). The industry is one of the fastest growing agro-industry in Zambia, having grown significantly from 12 members, to the present membership of 68 large-scale farmers and 500 small-scale farmers (CBZ, 2003).

Large coffee farmers include the African Plantation Company Limited (APC), Mpongwe Development Company (MDC), Galaunia farms and Watergreen farms. Others are Terranova, Nanga Farms and Smallholder Growers Association. APC is the largest coffee establishment in Zambia and it is located in Kasama. Apart from Kasama, other coffee farms are found in Mkushi, Serenje, Chisamba, Kabwe, Ndola, Luanshya, Kitwe, Lusaka and Mazabuka.

Most plantings on the independent farms started around 1984 with the continued expansion throughout the 1990s as world coffee prices reached all-time record high and finance was available through the World Bank Coffee I and II loan facilities and also from the Enterprise Development fund (CBZ, 2003). Coffee growing expanded initially in the Northern Province and progressively spread to Luapula and the Copperbelt.

The Zambian government through the diversification programme of broadening foreign exchange earning base veered its attention to accelerate development of coffee. Among other things research investigations were carried out under the supervision of the Ministry of Agriculture, which manly focused on investigating the varieties, adaptability, yield, suitability and resistance to pest and diseases, especially Coffee Berry Disease.

Zambia has great potential to increase its coffee production, given the fact that it produces high quality Arabica coffee, which is on high demand on the international market (CBZ, 2003).

2 Statement of the Problem

Currently the coffee industry in Zambia is progressively gaining popularity due to the favorable agro-ecological conditions and the increasing ready international market on account of its high cup quality. While on the world market coffee generates about U$ 80 Billion of the trade annually, Zambia s share of the market amounts only to 0.01245 percent. In support of governments diversification programme of broadening the base for foreign exchange earnings, the coffee Board of Zambia is aiming high, at increasing Zambia s share of the world coffee market (CBZ, 2003).

A lot of research has been done on coffee in the country. However most, of this research has focused on technical aspects and mostly at research stations.

In Zambia no quantitative research has been done to analyze the various factors that affect coffee exports in the country (CBZ, 2003). Branchi, Gabriele and Spieza (1995) did a cross-country linear regression analysis. Although this study covered a number of countries in the Sub-Saharan Africa, it did not include Zambia. Further, this study only included real exchange rate, taxation, area planted and coffee growth rates as regressors on coffee production and exports.

Several other important factors were not considered, such as commercial bank interest rates, exports substitutes and inputs. It is important to understand the potential impacts of these factors because they also affect the quantity of coffee exported (Henderson and Poole 1991). Domestic interest for example determines the cost of borrowing, when high they imply less money is borrowed and consequently less investment in coffee production and exports and the converse is also true. Inputs will determine the level of investment in coffee production and exports, since the cost of inputs will determine the type and size or quantity of input the farmer is going to purchase. Finally it is important in empirical analysis of supply to include the prices of competing commodities, which compete for the same resources as explanatory variables (Colman and Young, 1989).

1.4 Objectives

The general objective is to determine the factors that affect coffee exports in Zambia.

1.4.1 Specific Objective

1. To identify the factors that affect coffee exports,
2. To determine to what extent these factors affect coffee exports individually and collectively.

1.5 Hypotheses

1. Quantity of coffee exported is fairly elastic with respect to commercial bank interest rates.
2. Devaluation of the country's currency increases the quantity of coffee exported
3. An increase in the lagged price of coffee increases coffee exports.
4. An increase in the lagged producer price of export substitutes and increase in the cost of inputs will reduce the amount of coffee exported.

1.3 Rationale

This research will help government formulate favorable economic policies in coffee production and exports by identifying incentives to coffee growing. It will also help those who want to invest in coffee production and exports through understanding of the factors that affects coffee exports.

1.5 Organization of the Thesis

This thesis is organized in to five chapters. The background of the coffee industry, statement of the problem, objectives, hypotheses and rationale of the research are presented in chapter one. In chapter two the empirical and theoretical literature are summarized. In chapter four the methods and procedures are discussed. Chapter five presents some findings of the research and interpretations. Finally in chapter six the conclusion and recommendation of the study are provided.

CHAPTER 2
LITERATURE REVIEW

2.1 Introduction

This chapter summarizes the empirical and theoretical literature on the determinants of coffee exports.

2.2 Empirical Literature

Branchi, Gabriele and Spieza (1995) in their study to determine the impact of price variables on coffee production and exports in some selected sub-Saharan countries, did a cross-country linear regression model. They found that the weight of domestic price policy in determining production and exports is relevant but should not be exaggerated, as most of the cross country variability in performance in the coffee sector is in fact related to non-price factors, some of which can be modified by strategic non-price policy interventions, such as addition skills on the part of the producer, as well as a suitable market, infrastructure, and technological and informational environment.

Lyakurwa (1998) in his study on primary exports and processing for exports in sub-Saharan- Africa (SSA) found that both institutional and policy induced factors affected SSA Export performance. The preliminary regression estimates for all categories of exports from SSA Indicated that real exchange rate; government expenditure and gross investment influenced the supply of exports. Further he did a preliminary regression and did not produce robust results from which policy Implications may be drawn.

Cameron, Kihangire and Potts (2002) in their study on the impact of exchange rate variability on exports of coffee. Found that based on risk-averse, Uganda's coffee exports are negatively related and significantly correlated with exchange rate variability at 5% level of confidence. Their result also suggested that the main

policy implication is that intervention to minimize excessive volatility in the nominal and real exchange rate under the floating regime could contribute to supporting the coffee export sector, economic growth and overall external macroeconomic stability in Uganda.

Alemayehu (2001) did an econometric analysis of coffee exports in Ethiopia. His findings were that, except for the price of competing goods, all regressors including the real exchange rate are not important in the short run. In the long run, on the other hand, supply factors proxied by the use of fertilizer are found to be the significant determinant of coffee export supply.

Jaeger (1992) did an econometric study on 21 sub-Saharan countries in order to estimate the price responsiveness of total agricultural supply and of a few crops taken individually. In the case of coffee he found a short run elasticity of 0.23 for SSA producers as a whole, however there was almost no significant results when examining each country separately. Further some of the variables included in the regression turned out to have the wrong sign (e.g. the real exchange rate had a negative sign) and no information on the statistical robustness of the regressions were reported (such as test of stationarity of the time series)

Sauti (1983) in his study evaluated the problems encountered by exporting agriculture products. He identified that high and prohibitive interest rates discouraged the exporters from borrowing. Further he identified that poor frequency of freights schedules affected quality of commodities on the international market.

Behrman (1968) in his study indicated that a large and sophisticated literature has been developed on the application of economic techniques to the estimation of supply responsiveness. These techniques have been widely and successfully applied in the USA agriculture. In his study he strongly supported the hypothesis

that farmers in economically underdeveloped countries respond significantly and substantially to economic incentives.

2.3 Theoretical Literature

Henderson and Poole (1991) defined exports as goods and services one country sells to other countries. From the theory of international trade the quantities of a commodity exported by a country are determined by a number of factors, including domestic interest rates, average price of inputs, real exchange rate, taxation rates, world price of the commodity, international price of competing commodities and the own price of the commodity exported. When interest rates are high the cost of borrowing is also high, hence less money is borrowed, and thereby reducing investment and vice-versa. In the case of coffee farmers, this will mean that the cost of borrowing will be high hence farmers reduce investment in coffee production. In the short run the amount of money borrowed by the farmers will affect the amount and type of inputs the farmers are going to purchase, hence variations in terms of inputs will affect the yields of coffee, and consequently the quantity exported (Henderson and Poole, 1991).

Exchange rates tend to affect the amount of the commodity exported. In this case the relevant price for the producers which affect their decision of whether to increase or reduce supply is the real price they receive, that is the purchasing power that can be obtained by the sale of one unit of coffee. Denoting *rpp* as the real producer price, it can be written as (World Bank, 1994)

$$rpp = \frac{pf}{cpi} = \left(\frac{pb}{wpi}\right)\left(e * \frac{wpi}{cpi}\right)\left(\frac{pf}{pb}\right), \qquad (1)$$

Where *pf* is the farmgate producer price in national currency *pb* is the international price of coffee in dollars, and e is the nominal exchange rate, *cpi*

and *wpi* stand for the domestic and the world price index, respectively. Equation (1) is reduced as shown below:

$$rpp = pb * rer * npc, \qquad (2)$$

where, *pb* is defined as the international price $\left(\frac{pb}{wpi}\right)$. In a small country such as Zambia *pb* can be considered as exogenously given. The second variable is the real exchange rate (rer), which reflects the average competitiveness of a country visa-a-vi the rest of the world $\left(e * \frac{wpi}{cpi}\right)$. Any rise in the value of *rer* corresponds to a real depreciation of the domestic currency. Other things being equal, this improvement in the country s competitiveness tend to translate into an increase in the supply of all exportables, including coffee.

Rational theory of expectation holds that firms and consumers make the most of the information that is available to them. (Hall and Taylor, 1997). If coffee producers know from past experience that whenever the previous year world price of coffee is high, the current price will be high also, the producers predicted high current price will lead them to increase their production and exports. The converse is also true. In this case the lagged world price of coffee will represent the previous price of coffee. Hence coffee exports are expected to be positively correlated with the lagged price of coffee. However due to the biological nature of coffee, the price of coffee is lagged by two years to allow enough time for the farmers to adjust to the predicted price based on the assumption that there is a time lag from the time the decisions are made before the actual changes occur in the quantity of coffee exported (Colman and Young, 1989).

An increase in the cost of inputs, other things being equal will decrease the supply of that commodity; a decrease in input prices has the opposite effect. In this case

in the cost of the inputs will tend to increase the quantity of coffee exported and the opposite is true. However since coffee is a tree crop capacity in terms of the trees cannot be increased in the short run, but producers can influence yields through the variations of inputs and labor (Hall and Taylor, 1997).

To maximize profits producers will choose to produce the best alternative commodity. In this case the production of coffee for exports will depend on the price of other competing commodities exported on the international market. In empirical analysis of supply, the prices of products that compete for the same resources are usually included as explanatory variables. Other things remaining the same, a rise in the price of a particular commodity can be expected to lead to a decrease in the area planted to the other commodity (Boehije and Eidman 1984). Since coffee is a tree crop the change will not be instantaneous, because enough time is needed to adjust production. This implies that a current change in the price of a substitute could result in changes of quantity of coffee exported over two, three or more years. In this case the price of cotton, which is a substitute, is lagged by two years (Colman and Young, 1989).

CHAPTER 3
METHOD AND PROCEDURES

4.1 Introduction

This chapter presents the sources of data collected, data analysis and model specification

4.2 Data Collection

This study involved the collection of Time series data from 1985 to 2003 representing a period of 19 years on the following variables; quantity of Coffee exported, commercial bank interest rates, nominal exchange rate, average price of inputs, and world price of coffee and price of cotton (Refer to appendix table 2 for raw data). The consumer price index was used to deflate the variables. The Sources of data were Zambia Coffee Growers Association (ZCGA), Coffee Board of Zambia (CBZ), Ministry of Agriculture and Co-operatives (MACO), FAO's World Agriculture Information Centre (WAICENT), website on internet Export Board of Zambia (EBZ), Bank of Zambia (BOZ) and Central Statistic Office (CSO).

4.3 Data Analysis

The empirical analysis of the study was conducted using regression analysis to estimate the parameters of the coffee export model. The ordinary least squares (OLS) technique was used to estimate the regression parameters. To be valid OLS requires a number of assumptions which are noted as follows; linearity: Dependent variable is a linear function of a specific set of independent variables, plus a disturbance, expected value of disturbance term is zero, disturbance have uniform variance and are uncorrelated, observations on the independent variables can be considered fixed in repeated samples and no exact linear relationship between independent variables and more observations than independent variables.

However the above assumptions are subject to the following violations

- Multicolinearity; this is when the explanatory variables are highly correlated. This can be detected by looking at the variance inflation factor (VIF). As a rule of thumb, for standardized data a $VIF_i > 10$ indicate harmful collinearity. This can be corrected for by dropping the explanatory variable.
- Autocorrelation; this is when there is correlation between members of series of observations ordered in time. This can be detected through the Durbin-Watson d Test. It can be corrected by using Estimated Generalized Least Squares (EGLS).

4.4 Model Specification

Based on the hypotheses on the export supply response the quantity of coffee exported in relationship to other variables was specified as follows;

$$\gamma_e = \beta_0 + \beta_1 lpc_{t-2} + \beta_2 lpct_{t-2} + \beta_3 cin_t + \beta_4 rin_t + \beta_5 rer_t + e \qquad (3)$$

Where: γ_e is net amount of coffee exported per-capita, lpc_{t-2} is lagged price of coffee (k/kg) (+); $lpct_{t-2}$ is the lagged producer price of cotton (k/kg) (+); cin_t is the cost of inputs (k/ha) (-); rer_t is real exchange rate (+); rin_t is real interest rates (-); e is stochastic term assumed to reflect the net impact of all unspecified variables influencing γ_e; t is a subscript representing the time period for the crop year. $\beta_0, \beta_1, \beta_2, \beta_3, \beta_4 and \beta_5$ are the regression coefficients. In the model, γ_e is the dependent variable and $lpc_{t-2}, lpct_{t-2}, cin_t, rin_t$ *and* rer_t are the independent variables or explanatory variables. The signs in the brackets represent the expected signs of the variables.

To determine the responsiveness of the quantity exported due to the independent variables the concept of elasticity was used. For the linear functional form, elasticity is calculated as follows at the mean;

$$E = \beta \frac{\chi}{\gamma} \qquad (4)$$

Where β is the regression coefficient, χ and γ are the means of the explanatory and independent variable respectively.

$E > 1$; Implies that a slightly change in the variable will result in a more than proportionate change in the quantity supplied.

$E = 1$; Implies that a change in the variable will result in the exactly proportionate change in the quantity of commodity supplied

$E < 1$; Implies that a change in the variable will result in a less than proportionate change in the quantity of the commodity supplied

CHAPTER 4

FINDINGS AND INTERPRETATIONS

5.1 Introduction

This chapter presents the results of the research, significance of the model used, parameter estimates and interpretations of the Elasticities. It also provides the limitations of the study.

5.2 Results of Coffee Export Model Simulation

The empirical results of the Coffee Export Model are summarized in the table 2. Table 2.1 represents the means of the variables.

5.3 Significance of the Model and Parameter Estimates

As shown in Table 2, the F Statistic indicates that the model is significant at 1%, hence may be appropriate method for the analysis. The R^2 implies that variables included in the model explain 74% in the variation of the quantity of coffee exported.

In addition the various aspects relating to Multicolinearity and Autocorrelation were examined before any diagnostic test in order to obtain interpretations based on reliable efficiency and consistent estimators. In general the results suggested that;

- Multicolinearity was not a problem; each of the calculated VIF was less than 4 against the rule of thumb of 10.
- The Durbin Watson statistic indicated that there was no Autocorrelation. The Durbin Watson statistic calculated was found to fall between the critical value d_U and $4-d_U$.

All the variables with the exception of the real interest rates were significant, the lagged price of coffee at 1 percent, real exchange rate and lagged price of cotton at 10 percent, the cost of inputs at 1 percent significant level. Further all the significant variables turned out with correct signs except for the cost of inputs and real exchange rate. For the cost of inputs it might be due to the fact that the

farmers might have used different combination of inputs, for example some might not have included the cost of fuel or electricity. In the case of the real exchange rate the time might not have been adequate for the farmers to make changes in their exports. For example maybe some contracts were already made before any changes in the real exchange rate. In other words the variables in the model are relevant determinants of the net amount quantity of coffee exported per capita except for the real interest rates.

Table 2: Results of Export Model Simulations

(Dependent variable is the net amount of coffee exported per capita)

Variable Description	**Parameter Symbol**	**Parameter Estimates [a,b]**	**Elasticities**
Constant	$\beta_{0,}$	292.052** (109.891)	
Lagged price of coffee K/kg	$\beta_{1,}$	0.081** (0.042)	0.628
Lagged Price of cotton in K/kg	$\beta_{2,}$	-0.226* (0.13)	-1.196
Cost of inputs in K/ha	$\beta_{3,}$	0.00024*** (000)	1.16
Real interest rate	β_4	-0.230 (0.746)	0.02
Real exchange rate	$\beta_{5,}$	-0.222 * (0.108)	-1.01
R^2		0.819	
Adjusted R^2		0.736	
Sample Size		17	
Durbin Watson		2.091.	
F-Statistic		9.925***	

Notes: [a] Significant: * is significant at 10%; ** is significant at 5%; *** is significant at 1%. [b] Standard errors are in parentheses

Table 2.1 Means of the Variables

Net amount of Coffee. Exports per capita	Lagged price of coffee	Lagged price of cotton	Cost of inputs	Real exchange rate	Real interest rates
174.63	1355.07	924.28	846419.20	798.9354	-18.097

5.4 Interpretation of Elasticities

The Elasticities for the variables were greater than one except for the lagged price of coffee. This implies that the quantity of coffee exported is not very responsive to the changes in the price of coffee, but very responsive due to slight changes in the price of cotton, cost of inputs and real exchange rate. For the lagged price of cotton and lagged price of coffee, the changes in the quantity of coffee exported per capita are expected to occur two years later.

5.5 Limitation of the Study

Data on time series was difficult to obtain, for most of the explanatory variables, hence led to the dropping out of the tea variable which was an otherwise good substitute for coffee since it is a tree crop. In addition the analyst would have preferred to carry out a regression analysis differentiated by destination however time series data was not adequate.

Further instead of using the producer price index to deflate the producer prices and the world price index in combination with the consumer price index to deflate the nominal exchange rate. The consumer price index was used as a proxy to deflate the variables.

CHAPTER 5
CONCLUSION AND RECOMMENDATION

6.1 Introduction

This chapter summarizes the findings of the research and presents the recommendations

6.2 Conclusion

The main purpose of the study was to determine the factors that affect coffee exports in the country and also determine the extent of their effect individually and collectively. It was expected that the net amount of coffee exported per capita to vary with respect to real interest rates, lagged price of coffee, lagged price of cotton and the real exchange rate.

The results suggested that except for real interest rates all the variables had significant effect on the net amount of coffee exported per capita. The results also show that about three quarters in the variation of the net amount of coffee exported is due to the variables in question. While the other variations in the net amount of coffee exported not explained by the model might be due to other factors, which can not be easily quantified such as technology, transportation, extension services, reliability of the marketing net works and organizations.

Further it was found that the net mount of coffee exported per capita tended to vary greatly given a slight change in the variables except for the lagged price of coffee. Therefore it can be stated that except for the real interest rates, the variables are relevant determinants of the net quantity of coffee exported per capita and except for the lagged price of coffee, any change in the variables will influence the net quantity of coffee exported per capita to a very great extent.

6.3 Recommendation

Like many other coffee growing countries, the Government of Zambia regulates the Coffee sub-sector. Hence based on the findings it is recommended that Government should provide subsidized inputs to the farmers, for example it might be in form of a Fertilizer Support Programme, were farmers pay half the price for the fertilizer. However such a policy will only be effective if the target group is clearly defined, this is because many farmers tend to provide false information in order to fall within the eligible groups.

In addition government should ensure that the price of coffee is able to face competition from other crops, however since the price of coffee is exogenously influenced by the vagaries of the international market the government can only improve the price of coffee through it's continuous intervention (research and extension services) in the production of coffee to ensure that the farmers produces quality coffee. Quality coffee obtains premium price on the international market.

The government should also reduce on the overvaluation of the currency to increase the exports of coffee. In addition government intervention through the provision of addition skills on the part of the producer, as well as a suitable market, infrastructure, and technological and informational environment will help support the coffee sector.

Finally there is need for further research to analyze the factors that affect the countries, which import coffee, and to interpret the implications for the Zambian coffee policy.

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APPENDIX

APPENDIX 1: RAW DATA FOR COFFEE EXPORT MODEL SIMULATION

Marketing season	Per capita net exports of coffee (mt)	Price of coffee in K/Kg	Interest rate	Exchange rate (K/$)	Price of cotton in K/Kg	Price of inputs in K/Ha	Consumer price index (1994=100)	Population
YEAR								
1985	275	8.4089	29.7	3.14	3.23	1413	0.27	7,031,000
1986	284	29.298	33.5	7.79	8	4588.3	0.42	7,258,000
1987	402	21.4771	18.39	9.52	9.931	5712	0.62	7,489,000
1988	83	23.264	18.8	8.27	10.047	5110	0.94	7,724,000
1989	660	26.778	28.3	13.81	18.13	9363.2	2.1	7,962,000
1990	1422	46.95	35.6	30.29	30.196	24625.8	4.35	8,200,000
1991	205	119.68	44.3	64.45	66	50851.1	8.59	8,437,000
1992	1376	256.56	53.9	171.38	160	137104	22.83	8,673,000
1993	107	703.75	113.3	460.87	724	390633.4	64.68	8,908,000
1994	159	1337	70.6	677.5	726.544	574249	100	9,140,000
1995	333	3367.4	45.5	873.29	1211.3	786599	134.93	9,371,000
1996	2200	3001.5	53.8	1207.38	1358.3	966737.1	193.05	9,600,000
1997	2394	3384	46.6	1314.7	1443.2	1199401	240.18	9,827,000
1998	1696	6539.4	31.8	1853.05	1981	2064298	298.93	10,044,000
1999	2135	6713.7	40.3	2388	3139	2956344	379.01	10,243,000
2000	4018	6354	39.1	3111.6	3238.02	3854028	477.67	10,419,000
2001	4784	5568.1	45.9	3610.94	4044.79	11233634	579.86	10,570,000
2002	4520	5384	45.3	4306.91	4370.3	13782112	708.8	10,698,000
2003	6057	5372.42	40.5	4733.41	4847	16145662	860.5	10,812,000

Source; MACO, CSO, CBZ, FAO and EBZ